

	<b>Mercury Flooring Project</b>	<i>Page 1 of 10</i>
<b>Date: January 29, 2016</b>		
<b>Initial Testing of Identified Floors and Room Air</b>		

## TABLE OF CONTENTS

### 1.0 INTRODUCTION/SCOPE

### 2.0 BULK SAMPLING

### 3.0 AIR SAMPLING FOR MERCURY

#### 3.1 8-hour Indoor Air Sampling

#### 3.2 Seasonal changes

## APPENDICES

APPENDIX A – Sample Location Map

APPENDIX B – Data Reporting Template

APPENDIX C – Decision Matrix

	<b>Mercury Flooring Project</b>	<i>Page 2 of 10</i>
<b>Date: January 29, 2016</b>		
<b>Initial Testing of Identified Floors and Room Air</b>		

## **1.0 INTRODUCTION/SCOPE**

The School Facilities Board (SFB) recently became aware that a certain kind of rubberized flooring, typically used in school gymnasiums, multi-purpose rooms, cafeterias, and possibly in classrooms, has the potential to off-gas mercury vapors during the wear and tear of the flooring. The presence of the flooring does not automatically present a concern.

The SFB conducted a survey of school districts to determine whether these types of floors might be installed in any school. Based on survey responses, SFB will dispatch an assessment team to confirm whether the floor is in fact a suspected rubberized floor. If confirmed, SFB will coordinate with a third party consultant to perform both bulk floor and air sampling. The purpose of the air sampling is to determine whether a health risk exists.

This sampling plan lays out the specifications that shall be used when conducting sampling at an identified school. These specifications shall be used regardless of whether SFB or a school performs the testing. For all testing SFB conducts, it will maintain all test records until the relevant flooring is removed from the premises. SFB further requests that any school district conducting its own independent tests provide all test results to SFB so that it can maintain these records until the flooring is removed from the school. SFB also recommends any school district conducting independent tests also maintain all test records for the same for the same duration.

## **2.0 BULK SAMPLING OF THE FLOOR**

The purpose of the bulk sample is to:

- 1) Confirm that mercury exists in the flooring material and
- 2) Provide a data point to assist in the risk decision process.

### **Bulk sampling protocol:**

The flooring that is being assessed is commonly known as Tartan flooring, and was marketed under other names as well. It is a rubberized flexible flooring usually laid out as a base flooring directly on top of a concrete slab, or some other substrate. You may have the main wood floor, a composite secondary flooring (laid out on a channel system on top of the rubberized type flooring), or a mat that gives the floor more bounce. Be aware that the rubberized flooring is the item that may contain mercury. All different layers and separate pours should be analyzed to see if they contain mercury or have absorbed mercury from adjacent layers.

- One bulk sample shall be collected from each floor, pour, and/or overlay/underlay.
- Collect the sample from the edge of the floor, to minimize damage.
- Sample size should be ½ inch square and full thickness material.

	<b>Mercury Flooring Project</b>	<i>Page 3 of 10</i>
<b>Date: January 29, 2016</b>		
<b>Initial Testing of Identified Floors and Room Air</b>		

- Efforts shall be taken to seal the sample location, if possible.
- Follow sample collection/preservation protocols listed in SW-846 for analytical method 3050B/6020A.
- Report analytical results in parts per million (ppm) for initial determination of mercury levels and record in data spreadsheet.

- 

### **Special Notes Specific to Identification of Mercury Containing Flooring based on Bulk Sampling Results**

If mercury concentrations are less than 1 ppm, it can be assumed that the flooring was not manufactured using a mercury containing catalyst.

If mercury concentrations are greater than 1 ppm and less than 20 ppm, it is unlikely that exposures to mercury vapor in the gym could reach levels of concern. However, proper floor maintenance, adequate ventilation, and periodic air testing should take place to document levels are not exceeded.

If mercury concentrations are 20 ppm or greater, the concentration in the space may approach or exceed levels of health concern under specific conditions. Removal and disposal should be considered, but active ventilation could be a temporary option.

Please see the Decision Tree in Appendix C for additional information.

## **3.0 AIR SAMPLING**

### **Real time instant read air samples collected from selected location using manufacturer's recommended sample times**

- The purpose of the air sampling is to quickly determine if mercury concentrations in indoor air are at levels of public health concern. Agency for Toxic Substances and Disease Registry (ATSDR) has recommended an action level of 3  $\mu\text{g}/\text{m}^3$  for non-residential settings (such as schools); 1  $\mu\text{g}/\text{m}^3$  is recommended for residential settings (24 hour/day and 7 days/week). These values were determined based on the lowest known toxic concentration for human health of 10  $\mu\text{g}/\text{m}^3$ .
- Samples shall be collected by using either a Jerome J505 or Lumex mercury vapor analyzer. Equipment shall be calibrated in accordance with manufacturer instructions. Calibration records shall be retained and submitted with the final report.
- The room containing the flooring to be tested shall be gridded into equal spaces that shall not exceed 250 square feet and no closer than 6 feet from any wall and shall be reflected on the sampling plan that will be included into the final report submitted by the testing agency. If more than one HVAC unit services the space, the plan will reflect which zones are approximately

	<b>Mercury Flooring Project</b>	<i>Page 4 of 10</i>
<b>Date: January 29, 2016</b>		
<b>Initial Testing of Identified Floors and Room Air</b>		

associated with each HVAC unit so the correct ventilation rates can be recorded on the record table. This is to be recorded in the map (Appendix A) and the data record (Appendix B).

- Samples should be collected from breathing zones:
  - Breathing zone should be chosen based on the lowest grade level at the school. If a school contains any grades Kindergarten to 8<sup>th</sup> grade, then breathing zone should be taken at 3 feet. If a school's lowest grade is between grades 9-12, then breathing zone should be taken at 5 feet.
- Samples should be collected following these steps:
  - Set all sensor points and thermostats at 75 degrees;
  - Run the HVAC system for a minimum of 4 hours before testing
  - At the time of sampling, the building should be between 68 and 80 degrees;
  - Turn off HVAC system for 20 minutes;
  - Begin sampling.
- Using the example sample location map (Appendix A), multiple sample points must be selected to adequately represent the room(s) to be sampled. The size and number of grid samples will be dependent on the size of the area to be sampled and shall conform to the areas and specifications mentioned above, e.g., 250 square feet maximum per grid, HVAC ventilation, etc. Document sampling results on the sample location plan and log into data logging table (Appendix B) that will then be submitted electronically in the file provided to the vendor. The provided electronic file is not to be modified by the vendor.
- Measurements with the mercury vapor analyzer will be taken on the manufacturer's average time at each selected data point for the sampling equipment.
- Collect indoor air samples from other rooms connected to the room with rubberized flooring. If the connecting room(s) have separate HVAC systems, they are to be measured as previously mentioned and noted on the sampling plan as if they were in the same space as the rubberized floor.
- Outdoor air samples using the same sample height for the respective school will be collected in order to establish a background. Three (3) background samples shall be collected approximately 5 feet from the main entrance and twenty feet to each side of the main entrance. The location of the background samples shall be documented and submitted along with the other sampling data.

### **3.1 8 HOUR INDOOR AIR MONITORING**

This section will be applied in cases only where the initial test samples indicate elevated levels of mercury vapor, but not high enough to cause immediate action (Level C or D, per Appendix C), or sample test results causing enough questions that may require retesting of a particular floor or space. This will also apply to floors that will not be remediated immediately and will need semi-annual or annual monitoring to assess risk levels until remediation will be required (Level C, per Appendix C).

	<b>Mercury Flooring Project</b>	<i>Page 5 of 10</i>
<b>Date: January 29, 2016</b>		
<b>Initial Testing of Identified Floors and Room Air</b>		

The use of air pumps with sorbent tubes analyzed using the OSHA Method ID-140 and Lumex/Jerome Style meters is a common method of collecting air samples to measure concentrations of elemental mercury in air released by solid media such as these suspected gym floorings. These methods are used to collect air samples to provide estimates for the amount of mercury that could be inhaled by a human over an 8-hour period.

- In order to get a representative sample of the air that is inhaled by persons in the space during normal activities, samples should be collected in the normal breathing zone (3 or 5 feet above the floor) and as near as possible to normal gym use activities. This is the same intent as the air sample testing previously discussed.
- It is preferred that normal activities should be going on during the sampling event. Mercury is heavier than air and tends to lie along the surface of the flooring, so it is important for normal activities to be occurring and HVAC system(s) operating within normal occupancy settings in order to maintain as uniform mixing of air as possible.
- Sampling should be done by an active calibrated airflow sampler equipped with an effective mercury trap or prepared collection tubes that can be analyzed by an independent State-certified laboratory at the end of the sampling event. The SW846 methodologies should be utilized.
- The sampling event should be prolonged. The sampling event should extend through an entire work day schedule, beginning at the start of a work day and concluding at the end of the same work day, with an 8 hour minimum time period.
- The entire sampling process should provide accurate and consistent sampling flow and timing to allow for accurate calculations of the average mercury in the air at the time of the sampling event.
- All sample locations should be documented on a Sampling Location Map (see Appendix A) for future reference and possible retesting and shall conform to the specifications previously mentioned in section 3.0 - Air Sampling of this document for spacing, recording, and submitting.
- Document sampling results on the sample location plan and log into data logging table (Appendix B) and will be submitted electronically in the file provided. The provided electronic file is not to be modified by the vendor.
- SFB will contract to have an 8-hour sample randomly collected at 10% of the facilities identified to have a suspect floor.

### **3.2 SEASONAL CHANGES**

Sampling specifications listed in Section 3.0 were developed to ensure sampling is conducted at what is considered “normal operating conditions”, taking into account temperature and ventilation. By following the sampling plan, effects of seasonal changes will be minimal.

	<b>Mercury Flooring Project</b>	Page 6 of 10
Date: January 29, 2016		
<b>Initial Testing of Identified Floors and Room Air</b>		

### APPENDIX A

**SAMPLE OF TYPICAL GYMNASIUM FLOOR LAYOUT - AIR OR BULK SAMPLING LOCATION MAP**  
**ALL DATA MUST BE IN  $\mu\text{g}/\text{m}^3$  for Air Samples and Parts Per Million (ppm) for Total Mercury for bulk samples.**

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
<input type="checkbox"/> 11	<input type="checkbox"/> 12	<input type="checkbox"/> 13	<input type="checkbox"/> 14	<input type="checkbox"/> 15
<input type="checkbox"/> 16	<input type="checkbox"/> 17	<input type="checkbox"/> 18	<input type="checkbox"/> 19	<input type="checkbox"/> 20
<input type="checkbox"/> 21	<input type="checkbox"/> 22	<input type="checkbox"/> 23	<input type="checkbox"/> 24	<input type="checkbox"/> 25

Please draw in any doorways, locker rooms or storage rooms, and/or exterior door that were included in the air sampling plan. Check the box in the grids used for sampling (air or bulk). Please show North with an arrow on drawing.

NAME OF SCHOOL _____	PROJECT NUMBER _____
ADDRESS _____	DATE OF SAMPLING EVENT _____
CITY _____, ARIZONA, ZIP CODE _____	

NOT TO SCALE

	<b>Mercury Flooring Project</b>	Page 7 of 10
Date: January 29, 2016		
<b>Initial Testing of Identified Floors and Room Air</b>		

**APPENDIX B – Summary Sheet  
MERCURY SURVEY – DATA REPORTING TABLE**



**STATE OF ARIZONA  
SCHOOL FACILITIES BOARD**

Governor of Arizona  
Douglas A. Ducey

Interim Executive Director  
Philip G. Williams

**MEMO**

**Rubber Flooring Testing Results / Actions Summary**

School District Name	Completed by SFB	
School Name	before sending to vendor	
SFB Building ID / Use		
Test Date		
Outdoor Air Temperature		
Indoor Air Temperature		
Floor Surface Temperature	Self populating cells	
Bulk Sample Results – Mercury (PPM)		
Min. Mercury Vapor ( $\mu\text{g}/\text{m}^3$ )		
Max. Mercury Vapor ( $\mu\text{g}/\text{m}^3$ )		
Outside Air Intake at Test – CFM / %		
Determined Level (A, B, C, D)	Completed by ADEQ / ADHS	
Restrictions for Floor / Space	before signing	
Actions for Floor		

Arizona Department of Environmental Quality	
Completed by ADEQ	
Signature	Date
Print Name	

Arizona Department of Health Services	
Completed by ADHS	
Signature	Date
Print Name	

## Initial Testing of Identified Floors and Room Air

[illegible]

**Red area to be completed by Testing Agency**



## Initial Testing of Identified Floors and Room Air

**Red area to be completed by Testing Agency**

	<b>Mercury Flooring Project</b>	Page 10 of 10
<b>Date: January 29, 2016</b>		
<b>Initial Testing of Identified Floors and Room Air</b>		

## Appendix C

### Sampling Decision Tree Based on Mercury Indoors and Bulk Sampling Results

The decision matrix is based on the premise that identified floors will be remediated at some point. Recommendations are based on the floor, temperature, and ventilation conditions taken at the time of sampling.

